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DINOSAURS!

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Two *Herrerasaurus* are chased away from their kill 1860

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TROPEOGNATHUS

***Tropeognathus* was one of the largest and strangest of the pterosaurs.**

Pterosaurs were flying reptiles that soared in the skies in the Cretaceous Period, when dinosaurs walked the Earth. The pterosaurs were the largest flying creatures that have ever lived. The fossils of many different pterosaurs have been found in the area in South America that we now call Brazil.

BIGGEST BEAST

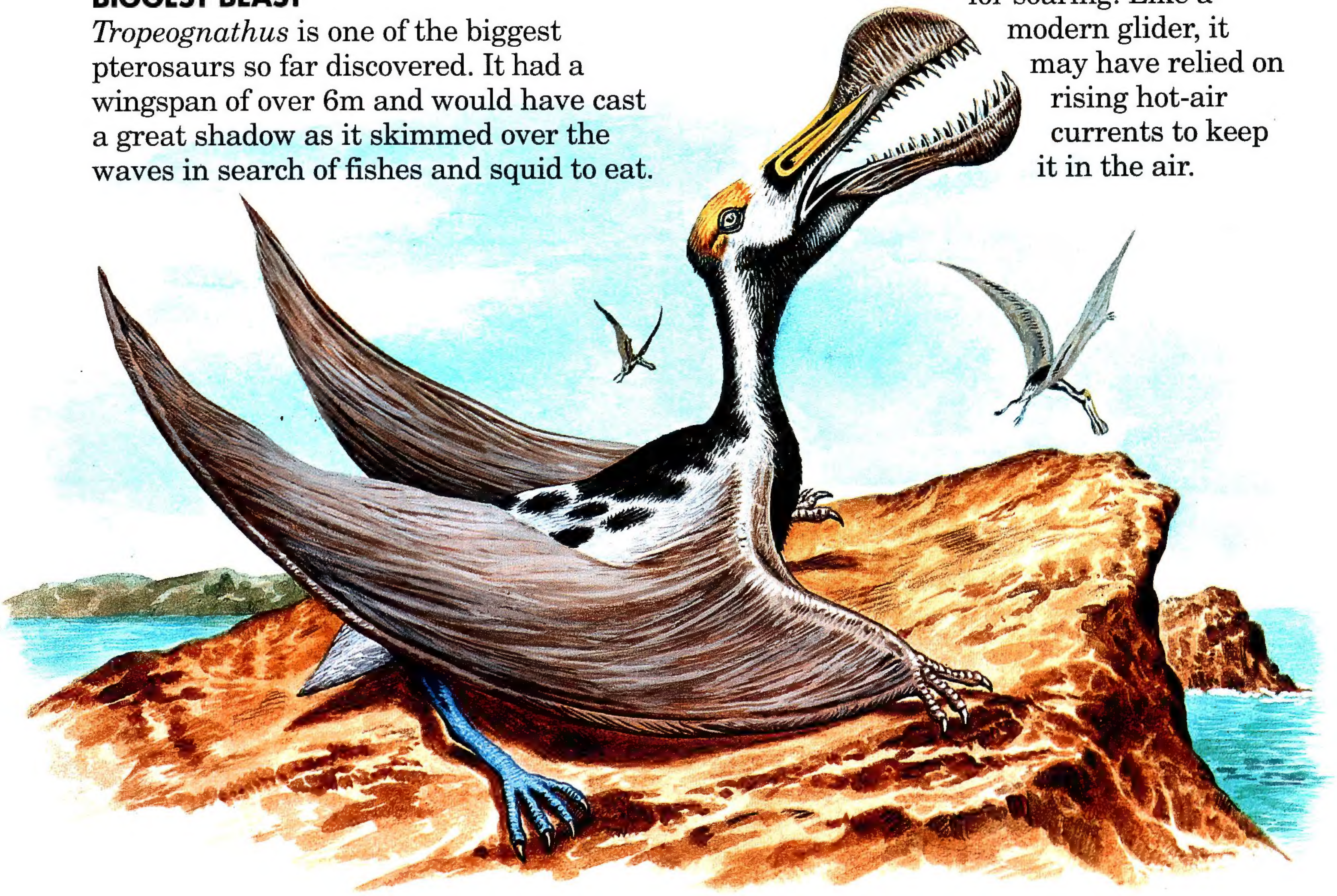
Tropeognathus is one of the biggest pterosaurs so far discovered. It had a wingspan of over 6m and would have cast a great shadow as it skimmed over the waves in search of fishes and squid to eat.

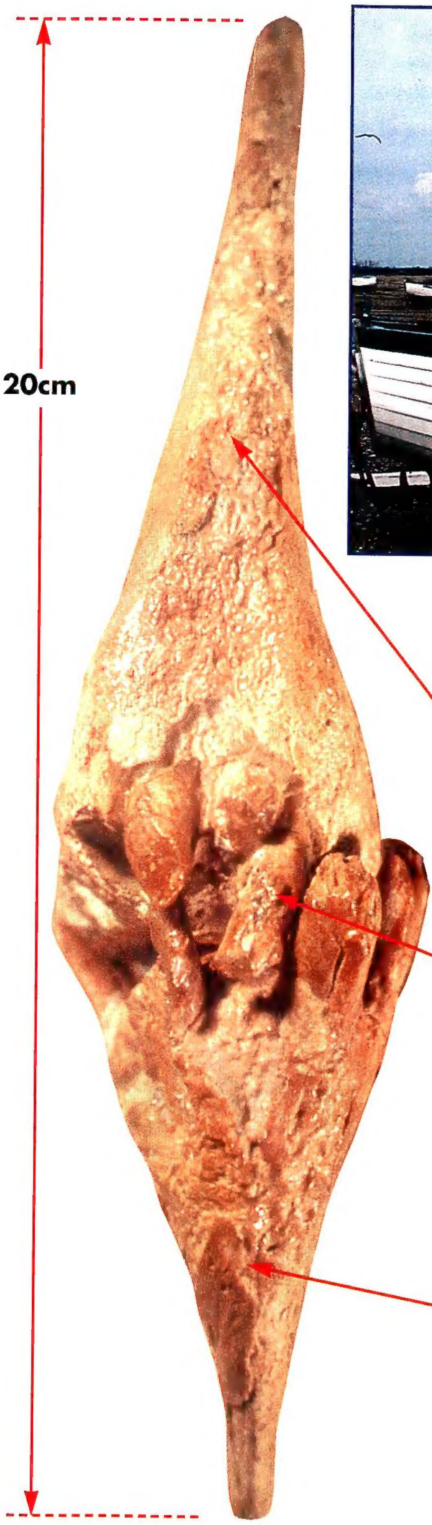
SHIP SHAPE

Tropeognathus, meaning 'keel-jaw', was named after the rounded shape of its strange bony jaw crest, which looked very like a ship's keel. A ship uses its keel to plough swiftly through the sea. *Tropeognathus* probably used its jaw crest in a similar way – to slice through the water when it speared fish.

SKY HIGH

Tropeognathus may have used its great wings for short bursts of flapping. But they were better designed for soaring. Like a modern glider, it may have relied on rising hot-air currents to keep it in the air.





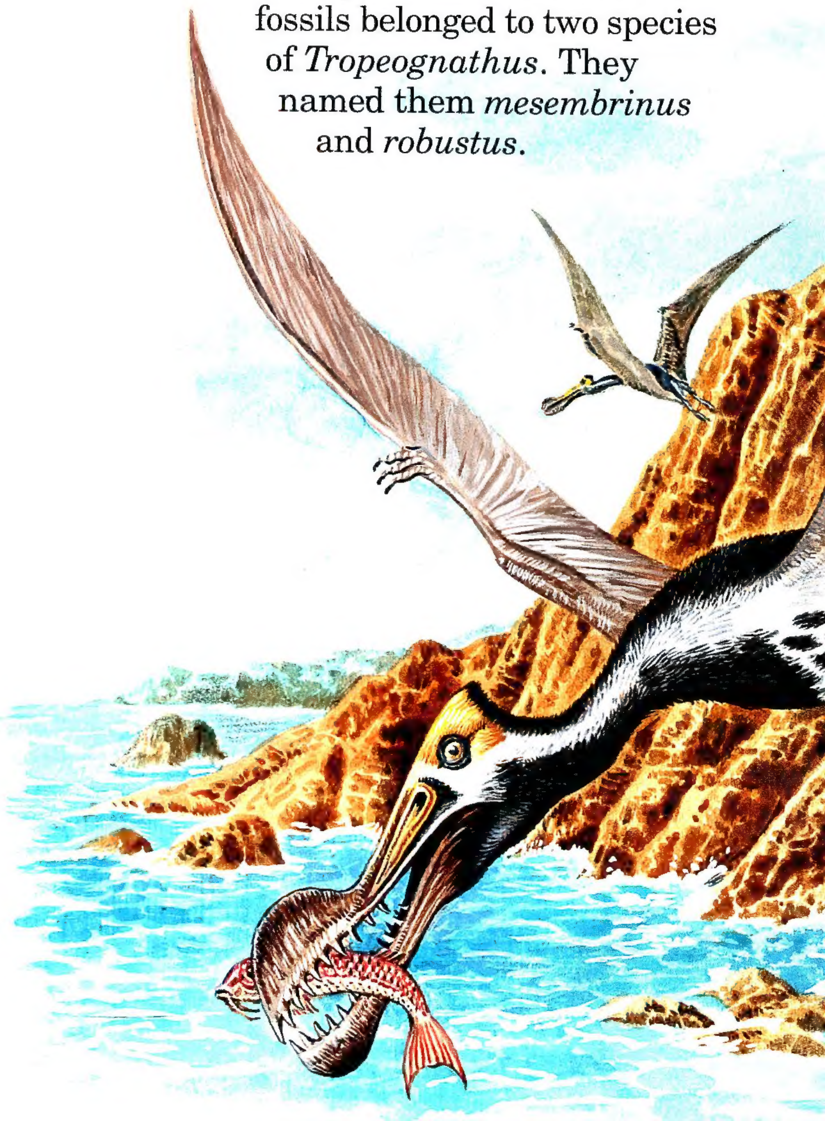
Imagine a *Tropeognathus* is flying straight at you, neck outstretched. This is the view (above) that you would have of the beak, with the teeth in the middle and the weird bony crest stretching above and below.

***Tropeognathus'* jaw was similar in shape to a ship's keel. This shape may have helped it to balance its long body as it skimmed for fishes.**

The African fish eagle is one of today's successful fish catchers.

TWO'S COMPANY

A complete skull and a lower jaw are the only *Tropeognathus* fossils discovered. The crest and teeth on the skull were not the same as those on the lower jaw, so experts decided that the fossils belonged to two species of *Tropeognathus*. They named them *mesembrinus* and *robustus*.



African fish eagle

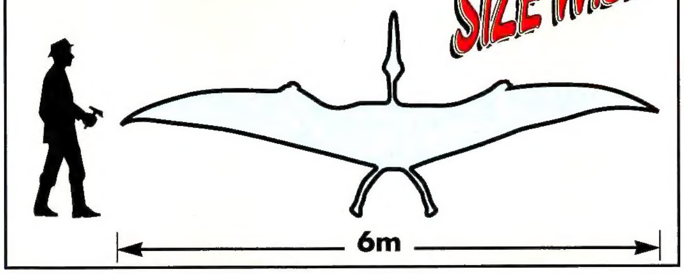
GONE FISHING

Tropeognathus' long jaws were lined with sharp, fish-eating teeth. It probably speared its prey with its long, strong front teeth. It could have held several slippery fishes at a time in its vast beak.

MONSTER FACTS

- **NAME:** *Tropeognathus* (trop-ee-og-nath-us) means 'keel-jaw'
- **GROUP:** pterosaur
- **SIZE:** 6m wingspan
- **FOOD:** fishes
- **LIVED:** about 120 million years ago in the Early Cretaceous in north-east Brazil

SIZE WISE



RUBBER NECK

Tropeognathus had a long, flexible neck. It needed to be able to move its neck easily and swiftly to catch fast-moving fishes. Its neck must have been very powerfully built, too. *Tropeognathus* needed to have strong neck muscles to use its beak to spear fish underwater. Imagine catching a fish in your mouth, then pulling it out of the water and flying up into the air again!

IT'S A FACT

GROUNDED

Experts disagree about how the pterosaurs might have moved about on land. Some scientists think they walked or ran like birds. Others believe they shuffled along like bats.

DESMOSTYLUS

The giant 'sea horse' *Desmostylus* had two pairs of powerful tusks.

D*esmostylus* paddled around in the coastal shallows of North America and Asia 25 million years ago in the Miocene Epoch. It was built like the hippopotamus we know today, but it probably lived and behaved more like today's walrus.

IN AND OUT THE WATER

Desmostylus grew up to 1.8m long – as big as a pony. The heavy creature probably pulled itself along quite easily when underwater, but it was a much more clumsy mover on land.

MONSTER FACTS

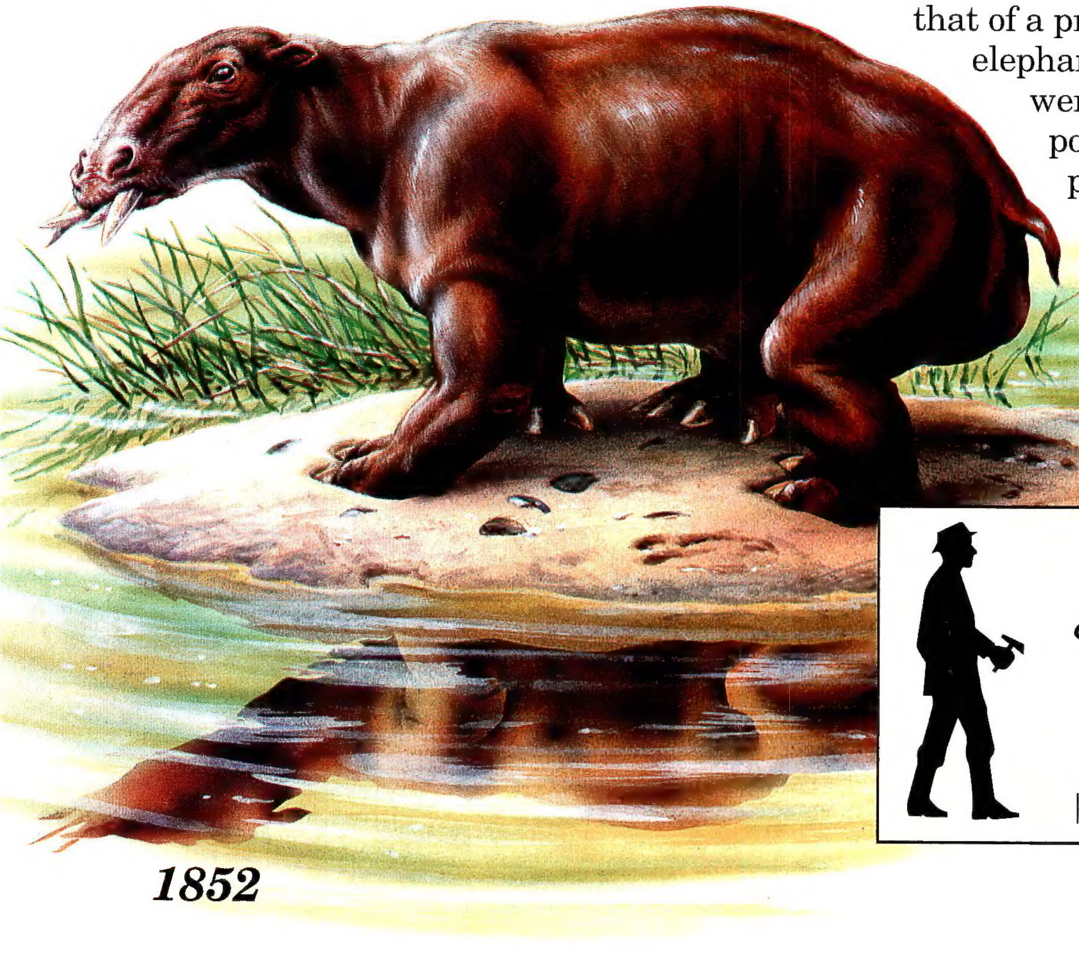
- **NAME:** *Desmostylus* (des-mo-sti-lus) means 'chain-pillar'
- **GROUP:** sea mammal
- **SIZE:** up to 1.8m long
- **FOOD:** shellfish and seaweed
- **LIVED:** about 25 million years ago in the Miocene in Japan and the Pacific coast of North America

HEAVYWEIGHT

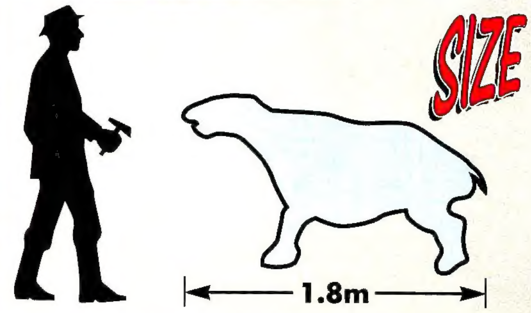
Desmostylus had a bulky body with four pillar-like legs and broad feet. Each foot had four hoof-like toes.

JUMBO

The head of *Desmostylus* was similar to that of a prehistoric shovel-tusked elephant. Its upper and lower jaws were armed with a pair of powerful tusks. *Desmostylus* probably used its tusks to prise shellfish and seaweed off the rocks. It could also have plunged down to the sea bed in search of things to eat.



SIZE WISE



CHIROSTENOTES

Stolen eggs were probably part of the diet of speedy *Chirostenotes*.

Chirostenotes looked rather like *Oviraptor*, the 'egg thief', which raided other dinosaurs' nests for its food. Both dinosaurs lived in the Late Cretaceous Period. Experts think *Chirostenotes* could have scavenged in the same way as *Oviraptor*, crushing food in its toothless, but powerful, beak.

HANDY WEAPONS

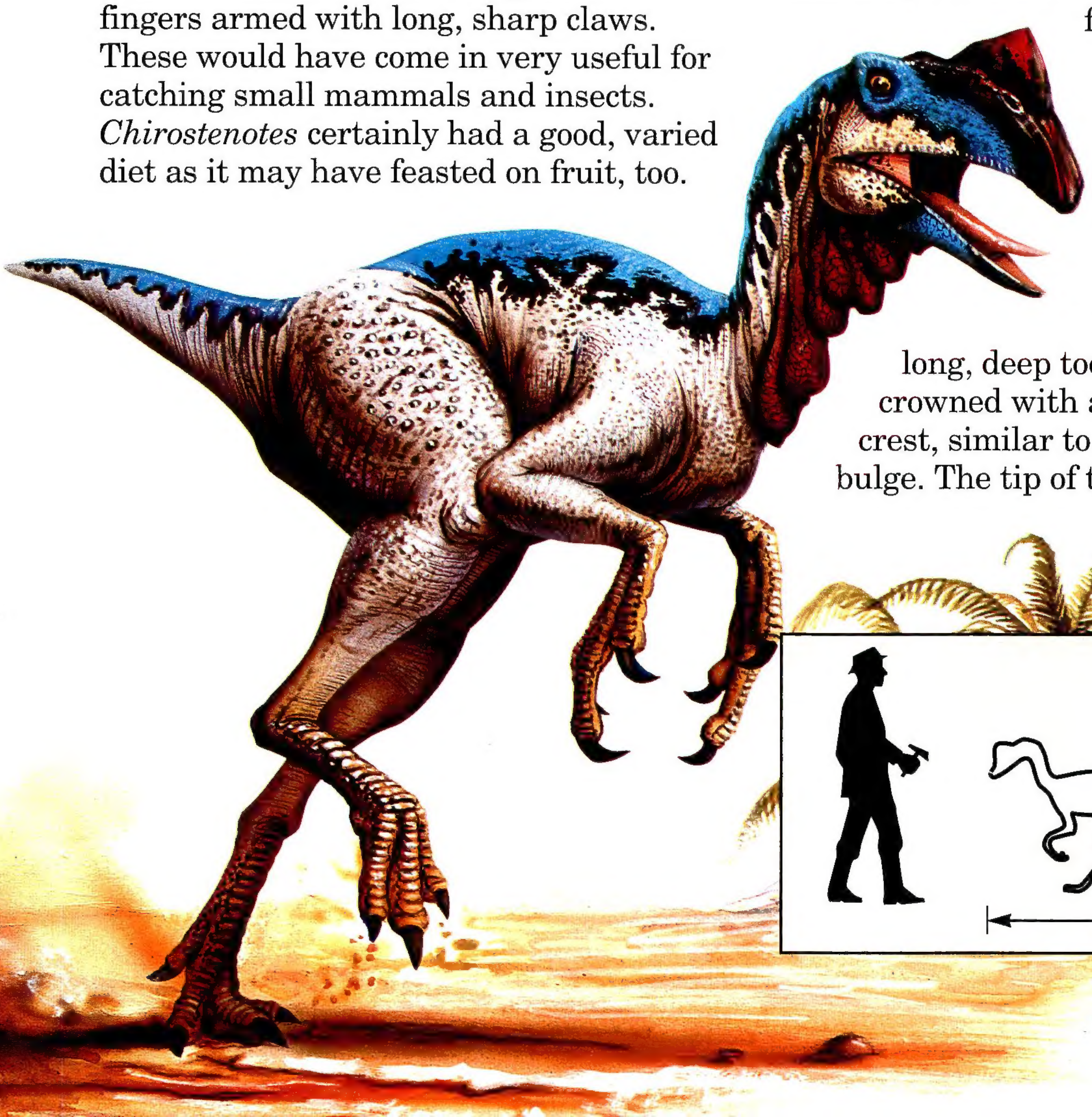
Chirostenotes had three long, slender fingers armed with long, sharp claws. These would have come in very useful for catching small mammals and insects. *Chirostenotes* certainly had a good, varied diet as it may have feasted on fruit, too.

MONSTER FACTS

- **NAME:** *Chirostenotes* (chy-ros-ten-o-tees) means 'narrow hands'
- **GROUP:** dinosaur
- **SIZE:** up to 2m long
- **FOOD:** eggs, meat and fruit
- **LIVED:** about 65 million years ago in Late Cretaceous Canada and Mongolia

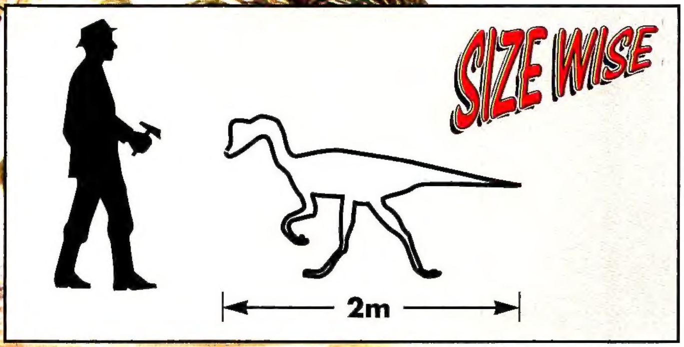
ON THE RUN

With its long hind legs and powerful bird-like toes, *Chirostenotes* must have been fast on its feet. Speed was probably its main defence against larger meat-eaters like *T rex*.



BUMPY BEAK

Chirostenotes had a long, deep toothless beak, probably crowned with a small horn-like crest, similar to *Oviraptor*'s bony bulge. The tip of the beak looked rather like that of today's parrot.



Dinosaur neighbours

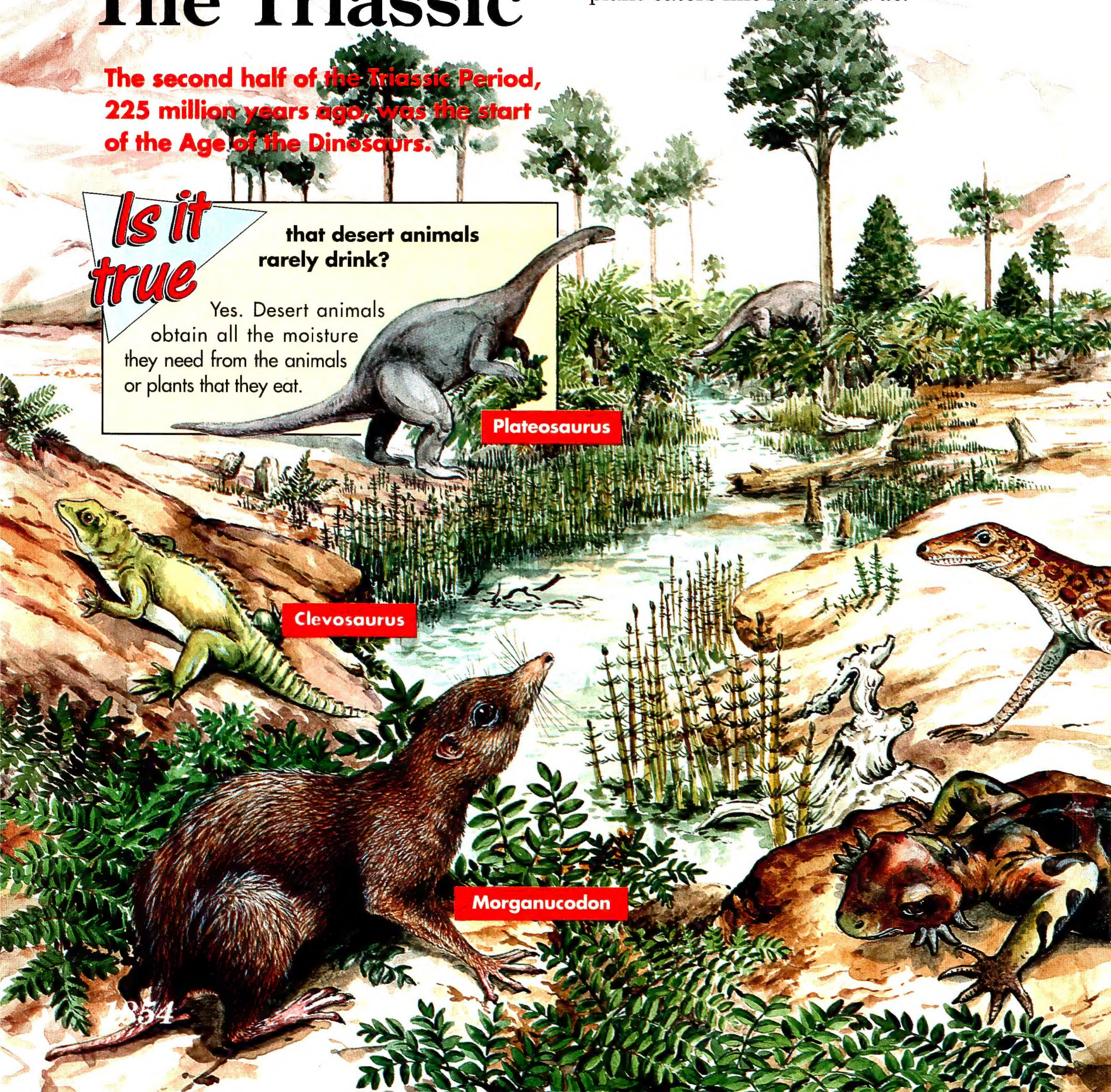
The Triassic

The second half of the Triassic Period, 225 million years ago, was the start of the Age of the Dinosaurs.

In the Triassic Period, one side of the world was covered by a single mass of mainly dry, desert-like land. Along the valleys and inlets, where the landmass was slowly cracking up, there were some moist areas with plenty of vegetation. The first dinosaurs lived there – meat-eaters such as *Herrerasaurus* and plant-eaters like *Plateosaurus.*

Is it true that desert animals rarely drink?

Yes. Desert animals obtain all the moisture they need from the animals or plants that they eat.



NOT ALONE

The dinosaurs were not the only animals in the Triassic deserts. Tiny animals scuttled around the dinosaurs' feet. They looked very much like the lizards and small mammals that live in deserts today.

LIZARD LOOKALIKE

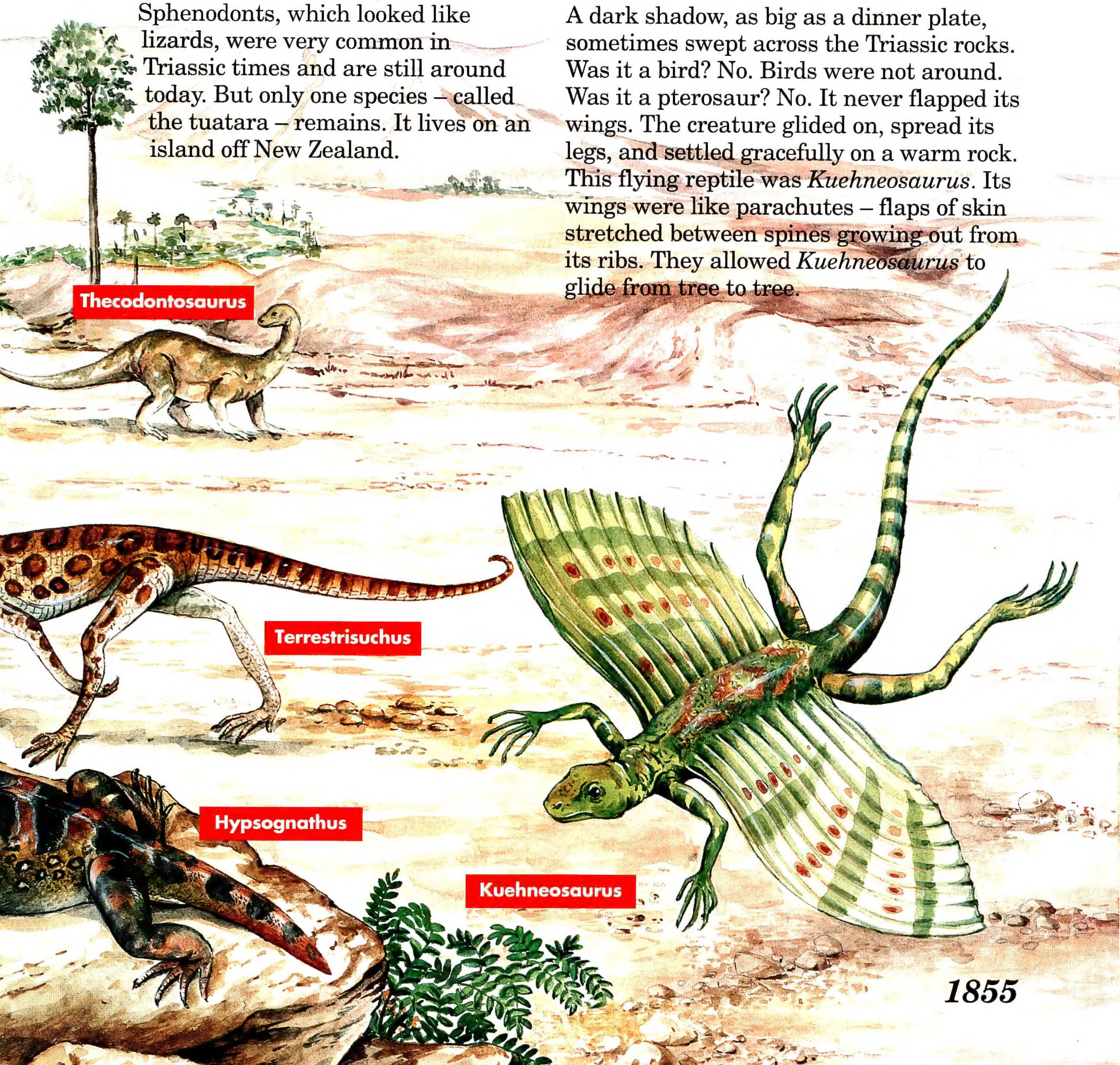
Clevosaurus was a type of small insect-eating reptile called a sphenodont. Sphenodonts, which looked like lizards, were very common in Triassic times and are still around today. But only one species – called the tuatara – remains. It lives on an island off New Zealand.

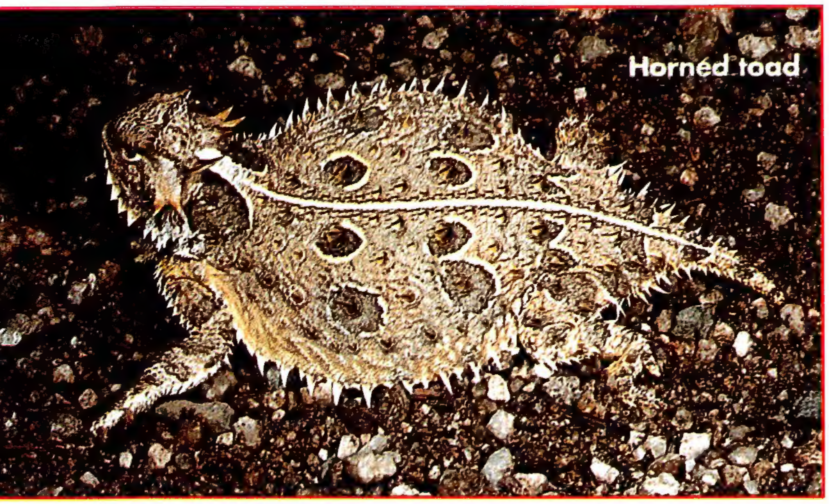
DESERT PLANT-EATER

Another small Triassic reptile was *Hypsognathus*. It had a squat body and spikes on its head, and resembled today's horned toad. It belonged to a group of animals called procolophonids. *Hypsognathus* ate the sparse desert plants.

FLYING REPTILES

A dark shadow, as big as a dinner plate, sometimes swept across the Triassic rocks. Was it a bird? No. Birds were not around. Was it a pterosaur? No. It never flapped its wings. The creature glided on, spread its legs, and settled gracefully on a warm rock. This flying reptile was *Kuehneosaurus*. Its wings were like parachutes – flaps of skin stretched between spines growing out from its ribs. They allowed *Kuehneosaurus* to glide from tree to tree.





Today's desert lizard, strangely named the horned toad, is similar to *Hypsognathus.*

OLD CROC

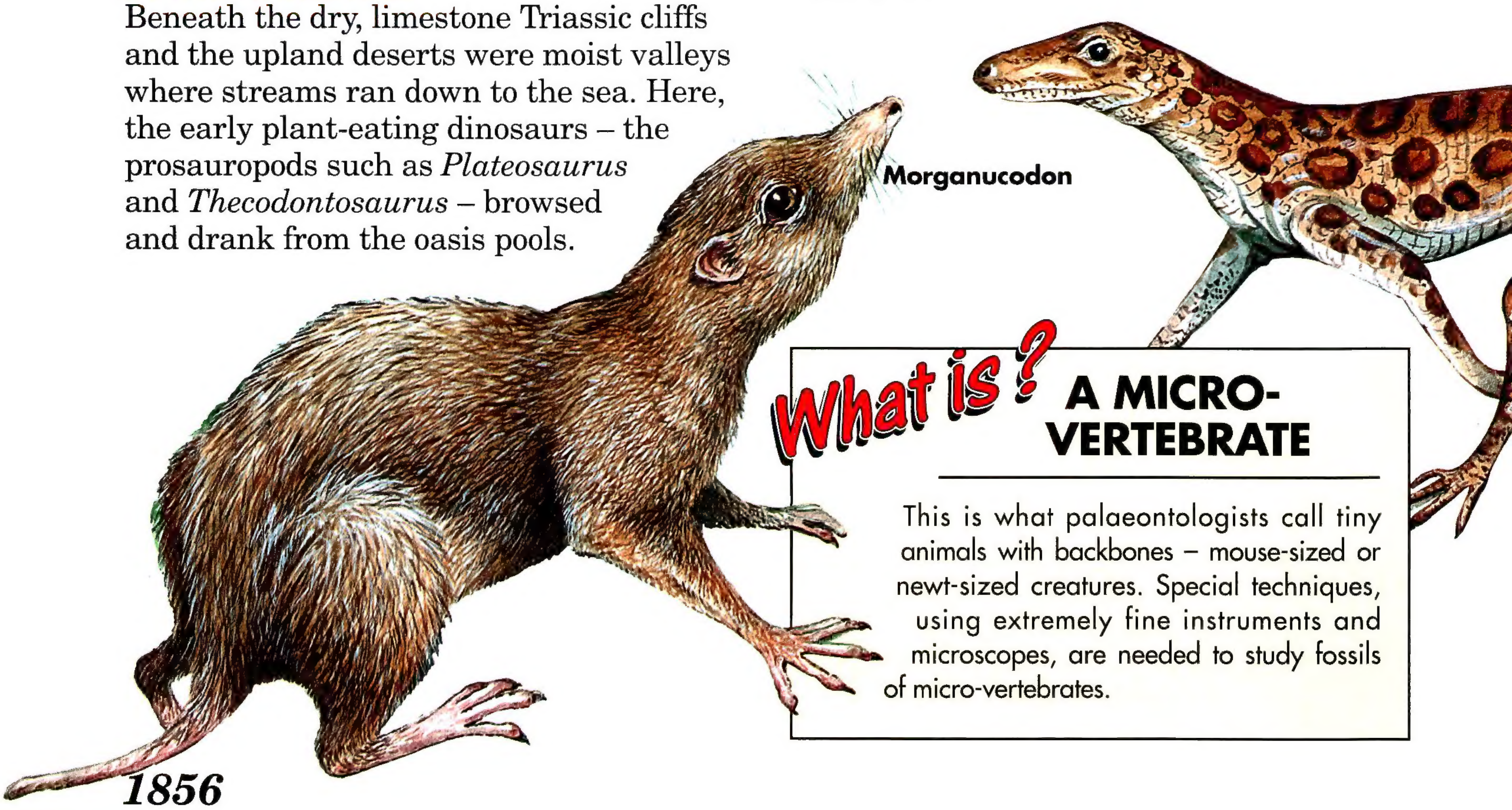
The dinosaurs could have seen a slim animal, about the size of a cat, as it scampered across the sandy wastes. Its skinny body, whip-like tail and long slender legs were quite unlike those of its relatives today. This is *Terrestrisuchus*, a kind of primitive crocodile. It was built for running over dry ground and hunting insects and small lizard-like animals.

IN THE WATERHOLE

Beneath the dry, limestone Triassic cliffs and the upland deserts were moist valleys where streams ran down to the sea. Here, the early plant-eating dinosaurs – the prosauropods such as *Plateosaurus* and *Thecodontosaurus* – browsed and drank from the oasis pools.

GREAT FUTURE

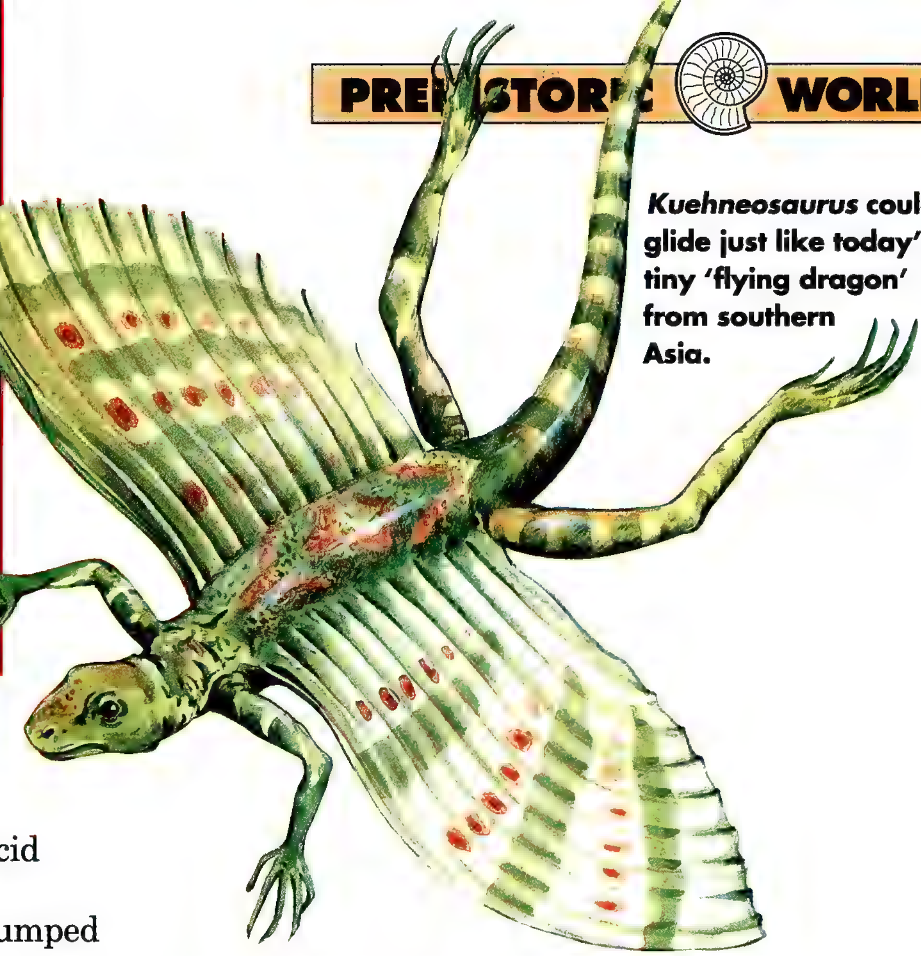
Surveying this scene from a safe distance was the triconodont, *Morganucodon*, one of the first true mammals. This insect-eater was probably active at night, when most dinosaurs were too cold to hunt. It looked just like a modern shrew – a very insignificant looking creature compared with the great dinosaurs. Yet *Morganucodon*'s descendants developed to rule the world long after the dinosaurs were gone.



What is? A MICRO-VERTEBRATE

This is what palaeontologists call tiny animals with backbones – mouse-sized or newt-sized creatures. Special techniques, using extremely fine instruments and microscopes, are needed to study fossils of micro-vertebrates.

Flying dragon



Kuehneosaurus could glide just like today's tiny 'flying dragon' from southern Asia.

DISTURBANCE

A distant rumble echoed through the air; the tree branches vibrated violently; ripples ran across the placid surface of the water – it was an earthquake! Little *Morganucodon* jumped up and scampered off through the undergrowth. *Clevosaurus* emerged from a crack in the rock. *Hypsognathus* shook off the sand that had fallen on its back, and *Terrestrisuchus* got over its sudden terror and continued its hunting.

SAFE AND SOUND

The earthquake harmed none of them. It was just a sign that the desert landmass had cracked a little more, and would one day break up into the different continents.

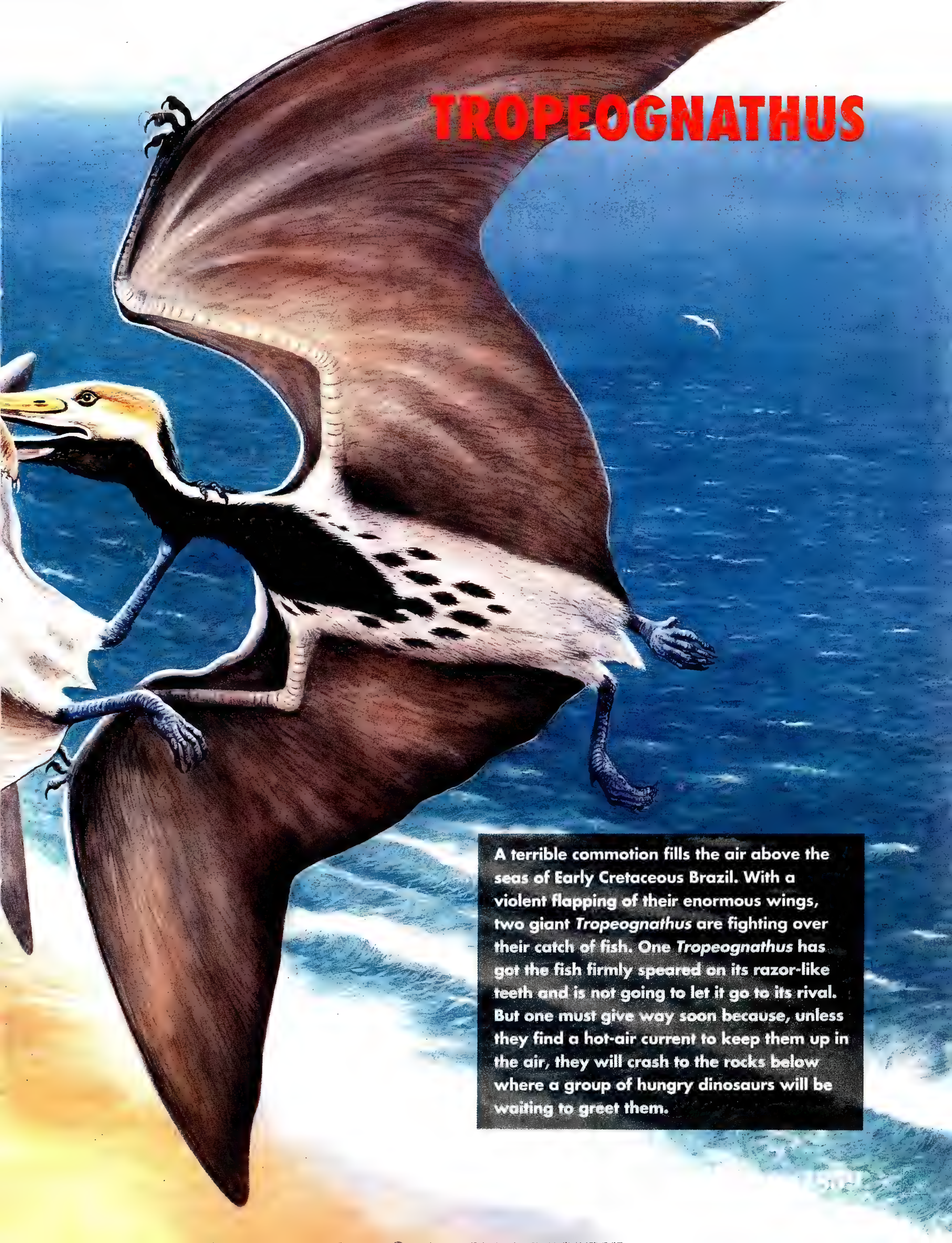
Terrestrisuchus

Tuatara

Clevosaurus **was a small reptile called a sphenodont. The only species of sphenodont alive today is the tuatara.**

GIANTS OF THE PAST

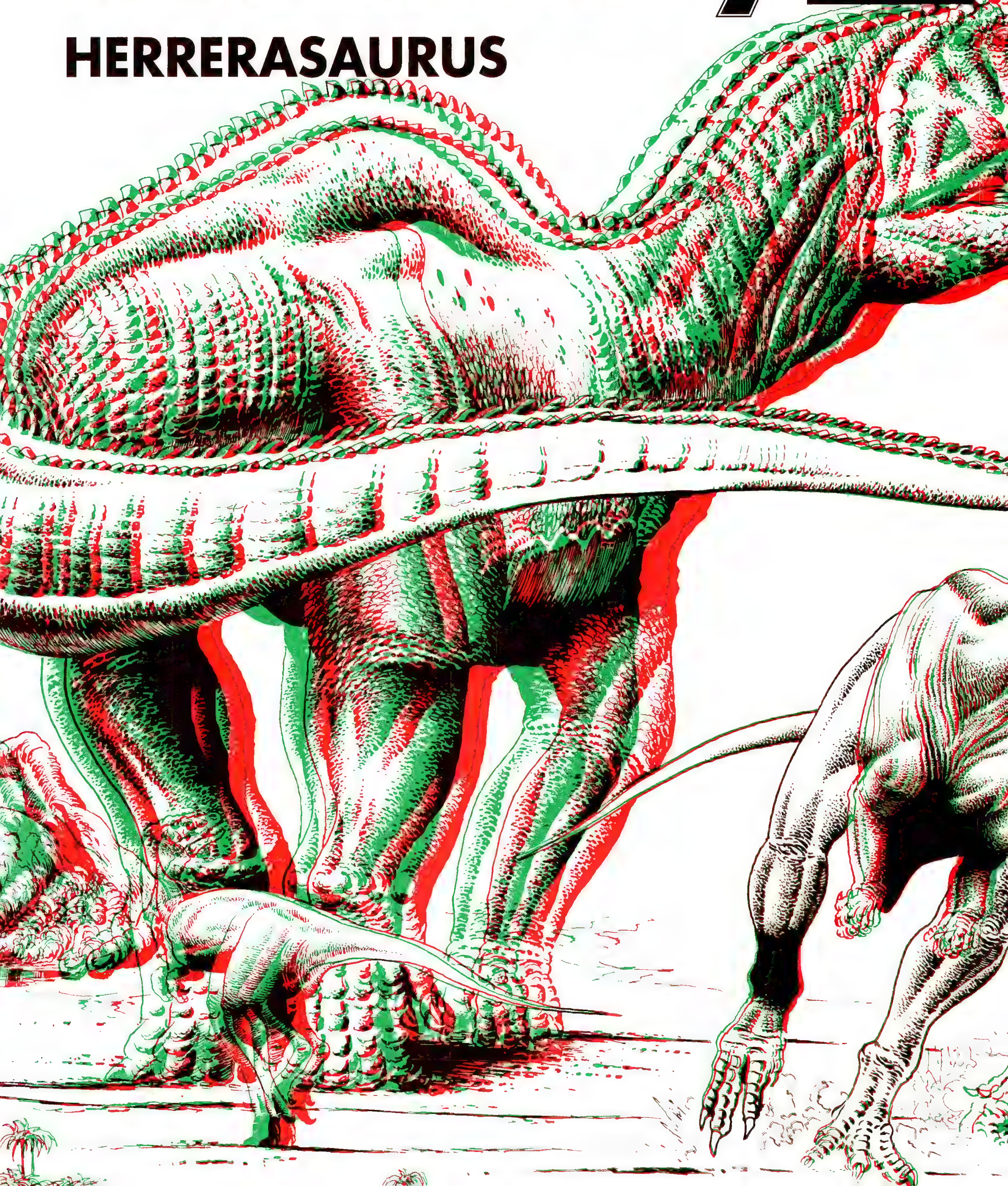
TROPEOGNATHUS

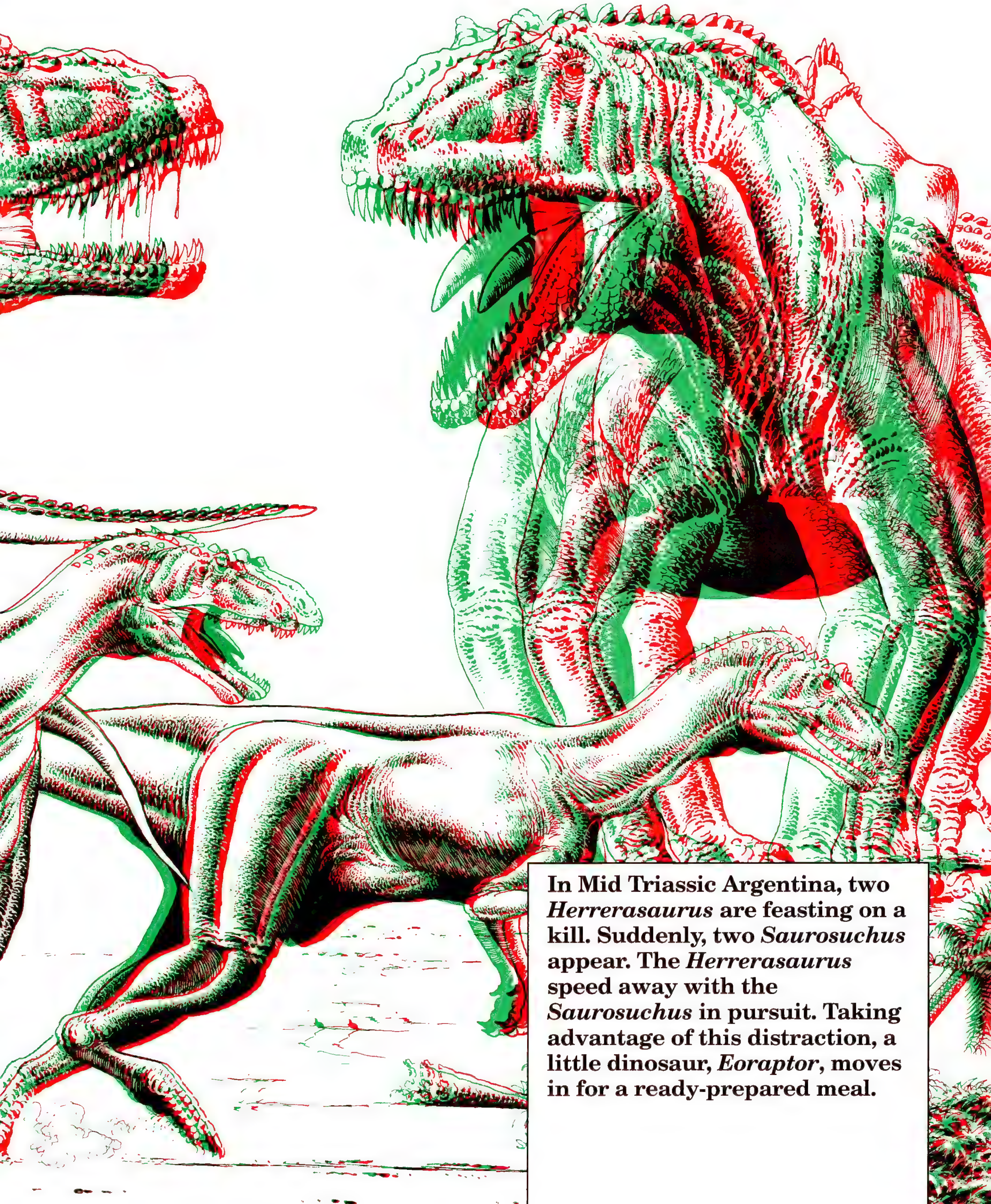


A terrible commotion fills the air above the seas of Early Cretaceous Brazil. With a violent flapping of their enormous wings, two giant *Tropeognathus* are fighting over their catch of fish. One *Tropeognathus* has got the fish firmly speared on its razor-like teeth and is not going to let it go to its rival. But one must give way soon because, unless they find a hot-air current to keep them up in the air, they will crash to the rocks below where a group of hungry dinosaurs will be waiting to greet them.

3-D Gallery 87

HERRERASAURUS





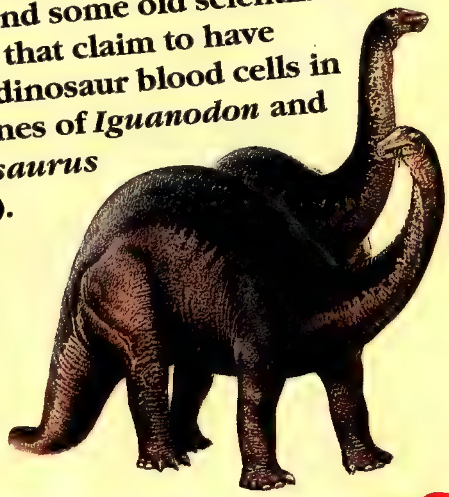
In Mid Triassic Argentina, two *Herrerasaurus* are feasting on a kill. Suddenly, two *Saurosuchus* appear. The *Herrerasaurus* speed away with the *Saurosuchus* in pursuit. Taking advantage of this distraction, a little dinosaur, *Eoraptor*, moves in for a ready-prepared meal.

STOP PRESS 3...

ANOTHER EXCITING EDITION OF YOUR MESOZOIC MAGAZINE

DINOSAUR BLOOD CELLS NOTHING NEW

Since *Jurassic Park* brought the idea of cloning dinosaurs from their blood cells into the news, scientists have been looking for dinosaur blood in fossils. It now seems that scientists found it years ago. R.E.G. Reid of Queen's University, Belfast, has found some old scientific papers that claim to have found dinosaur blood cells in the bones of *Iguanodon* and *Apatosaurus* (right).



DINOSAUR EGGS TOO BIG?

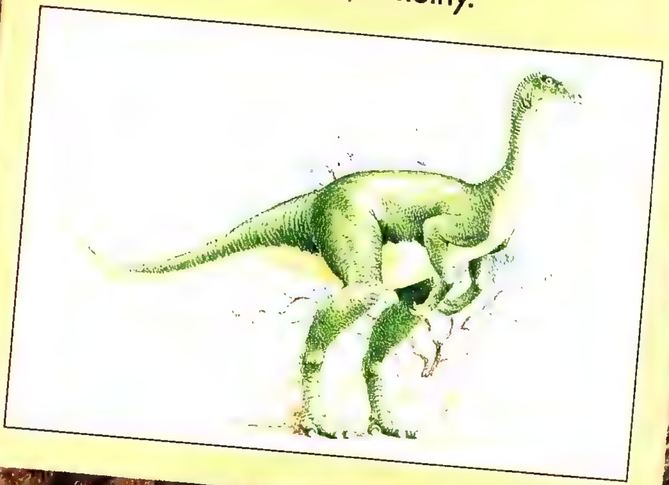
The largest dinosaur eggs so far discovered have been found in Helan Province, China. Believed to be from a tyrannosaur, at 42cm long they are much bigger than experts thought possible. The bigger the egg, the thicker the shell must be, and there comes a point when the shell would be too thick to allow the chick to get out.

Caecilian's ancestor had leg

A caecilian is a tiny amphibian
looks like a worm. It has no leg
eyes and it burrows in the grou
Scientists have often wondered
its evolution. Now, a fossilized
caecilian ancestor has been fou
It lived in Early Jurassic Arizo
Like today's caecilians, *Eocaec*
was long and thin. Unlike toda
species, it had eyes and tiny li

NAMED AFTER FINDERS' SON

The first Australian ornithomimid to be found was uncovered by Tom Rich and Patricia Vickers-Rich in Early Cretaceous rocks at Dinosaur Cove, Victoria. They have named it *Timimus* after their son, Timothy.



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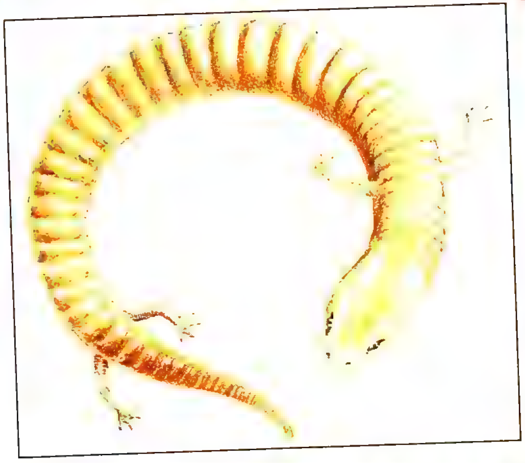
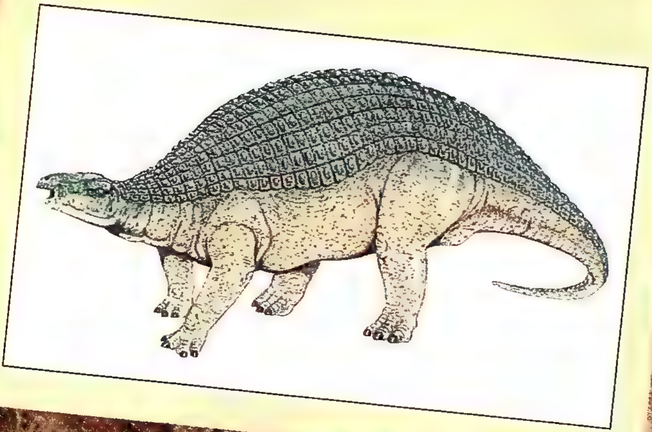


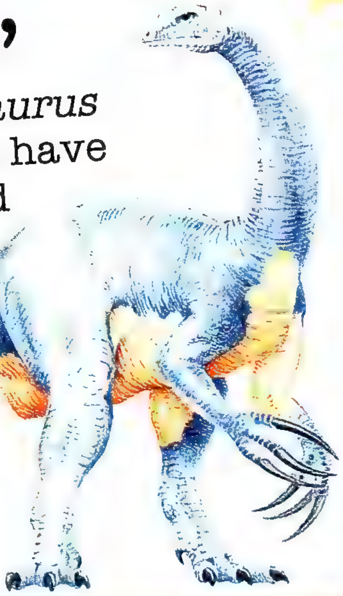
First Alaskan Ankylosaur

The list of dinosaurs that lived within the Arctic Circle is growing. Dr Ann Pasch, Dr Rolland Gangloff and Dr Mark Goodwin have studied a skull found there, and have proved that it belonged to a Cretaceous ankylosaur similar to *Nodosaurus* (below). This dinosaur has not been given a name yet, and is being held in the Dorothy Page Museum in Wasilla, Alaska, USA.

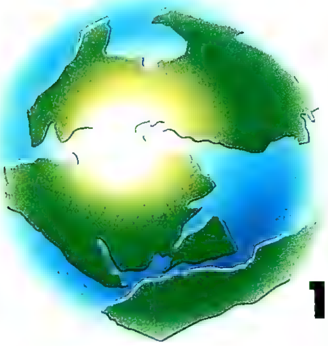


NEW LOOK FOR 'BIG ARMS'

For 40 years the only specimen of *Therizinosaurus* was a long arm with very long claws. Experts have never been sure what the whole animal looked like, but there have been many theories. Now, Dr Dale Russell of the Canadian Museum of Nature has built up a picture of the creature, using other bones he believes may have belonged to *Therizinosaurus*. It shows a squat-bodied, long-necked, plant-eating animal that may have walked on its knuckles like a gorilla.



Earth's changing face



Maps and globes of the world show the shape and position of the continents. But the Earth has not always looked as it does today. Let's look at the evidence suggesting that the continents have moved around.

The Earth was formed about 4,500 million years ago. For millions of years the rocks and minerals that make up the Earth were so hot that they were liquid. Very slowly, the surface of the Earth cooled down and landmasses formed.

HOT ROCKS

Deep beneath the surface of the Earth there is still a layer of very hot rocks. This is called the mantle. One part of the mantle is still quite liquid. The Earth's crust and landmasses – the continents – float on top of this liquid and they are slowly moving!

MOVING PLATES

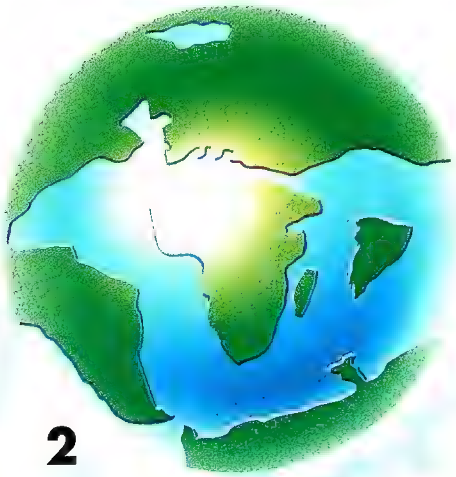
As the liquid mantle moves, it pulls the surface of the Earth around with it. Throughout the Earth's history, its continents have been slowly drifting. The shape of the landmasses have slowly changed over millions of years.

CLUES TO THE PAST

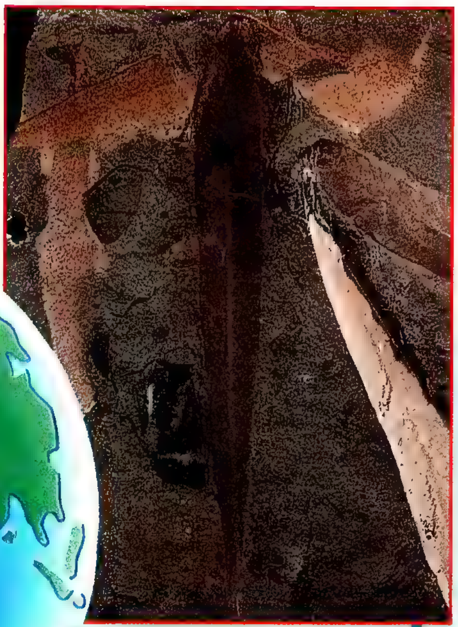
Scientists have found clues to suggest that the continents were once joined together. If two areas have similar types of fossilized plants and animals, it means that the animals were able to move between the two areas and that the land was probably joined at one time.

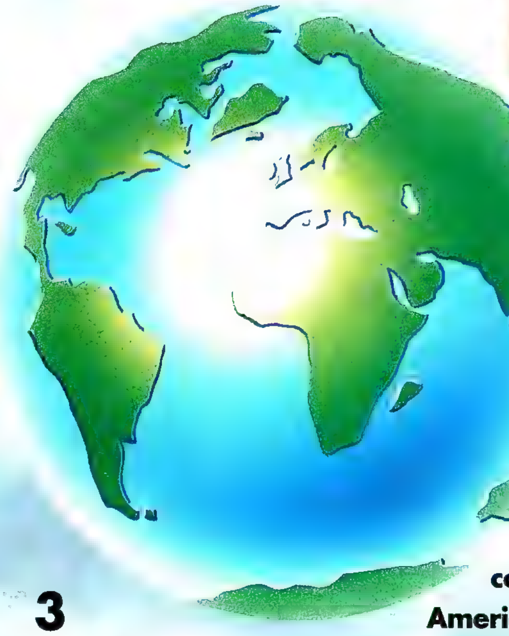
GONDWANA FOSSILS

Some of the best clues come from fossils of animals and plants from the Permian and Triassic Periods. Fossils of the fern-like plant *Glossopteris* and the reptile *Lystrosaurus* have been found in rocks throughout the southern continents, suggesting that they were all joined at one time. Dinosaur finds have also helped complete the jigsaw. A duckbilled dinosaur, *Secernosaurus*, has been found in both North America and eastern Asia.



Fossilized *Glossopteris* leaves (right) have been found in all the southern continents. This suggests they were once joined together.





1 THE LATE TRIASSIC 225 MYA

Scientists are not sure what Earth looked like when it was first formed 240 million years ago, but they believe all the continents were joined together. Scientists call this supercontinent Pangaea (Pan-jee-a). In the Late Triassic it split into two large landmasses called Laurasia (Law-race-ia) and Gondwanaland (Gon-dwan-a-land). The landmasses continued to drift further apart. About 160 million years ago, during the Jurassic, North America began to separate from Europe and Asia, and South America began to drift away from Africa. A long, narrow sea formed in the centre of this split.

2 THE LATE CRETACEOUS 66 MYA

The gaps between the continents widened. South America and Africa became completely separated by the sea, which formed oceans, including the Atlantic. India and Africa continued to drift towards Europe.

3 THE EARTH TODAY

The continents continued to move. About 50 million years ago, Australia separated from Antarctica and began to move north, and India collided with Asia. South America moved north to join North America.

LAND LINKS AND LOST SEAS

Scientists believe that horses evolved in North America and spread to Asia and then Africa about 1.5 million years ago, suggesting that these continents were once joined. *Archelon*, a giant turtle, has been found in central North America. This shows that the land must have been covered by a shallow sea during the Late Cretaceous. As scientists find more fossils, they find more evidence to support the idea of moving continents.

Is it true that the Atlantic Ocean is getting bigger?

Yes. As the continents continue to move the oceans and the landmasses are still changing shape. The Atlantic Ocean is growing by about 4cm a year and the Pacific Ocean is shrinking as North and South America drift west. Eventually North America may join with Russia and eastern Africa may separate from the rest of Africa, forming a giant island.

EARLY TIME DETECTIVES

In the 1500s, the Portuguese made maps of South America. They noticed a strange thing. If the east coast of South America and the west coast of Africa were placed side by side, they fitted together like a jigsaw puzzle.

THE FLOOD

Many ideas were put forward to explain this. One of the most popular in the 1600s was that the Great Flood, the story of which is told in the Bible, had split a giant area of land in two.

TROPICS AND GLACIERS

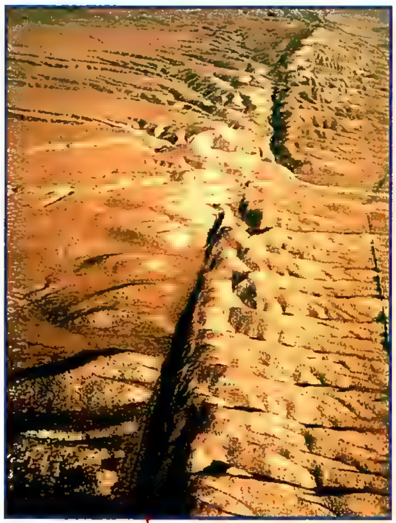
Then, at the beginning of this century, a German scientist called Alfred Wegener found fossil evidence that tropical ferns had once grown in Antarctica. He also found evidence that Brazil had been covered by icy glaciers. In 1915 he published a book showing how the continents had once fitted together, but he could not explain how they moved.

THE DISCOVERY OF PLATES

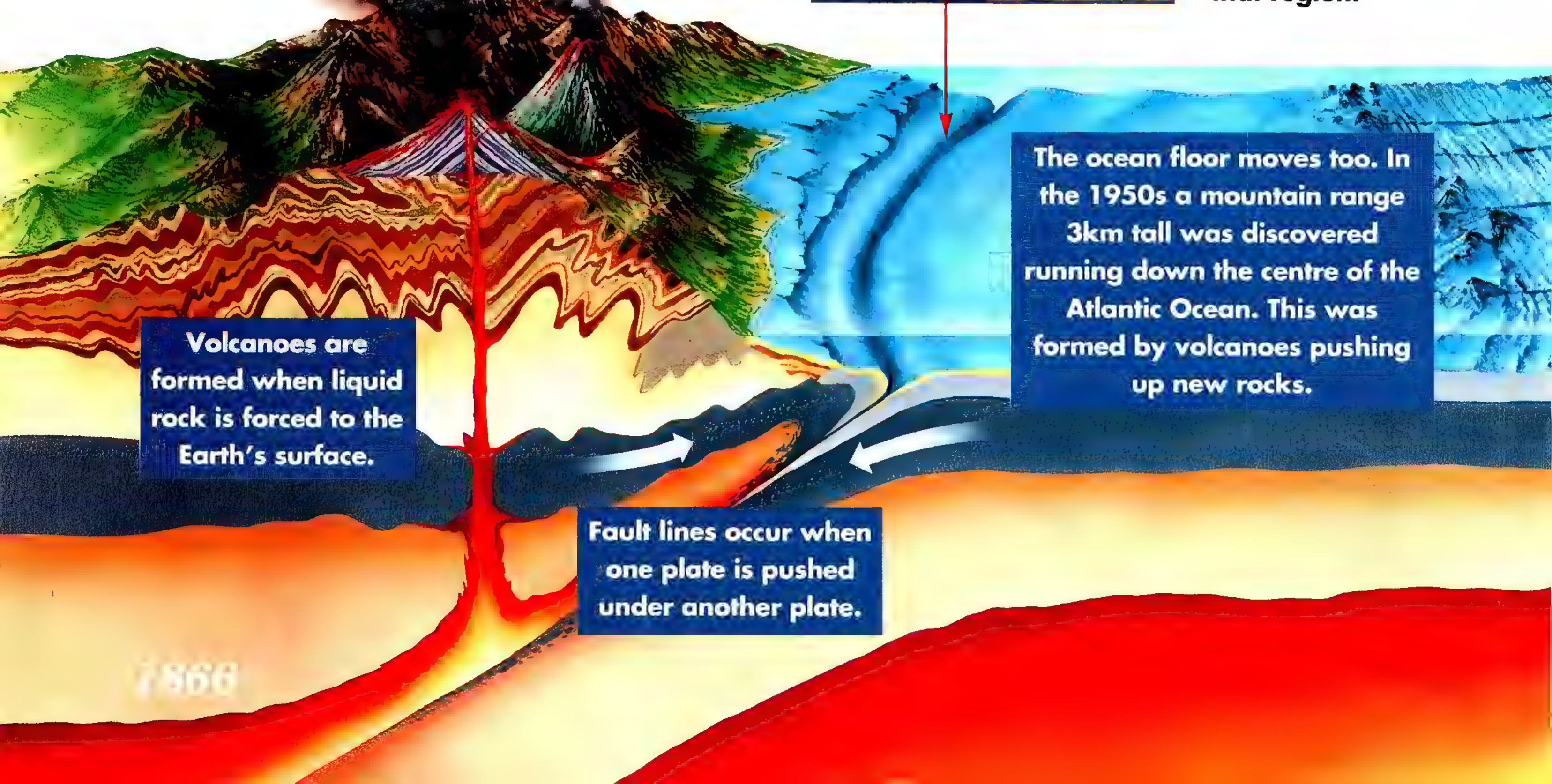
Most other scientists didn't believe Wegener's theories. It was not until the 1950s and 1960s that scientists realised the Earth's surface was not one solid crust but was divided up into huge, jagged slabs. These slabs are called plates.

VOLCANO!

When the plates move apart, liquid rock wells up from below the Earth's crust and forms a line of volcanic mountains. Liquid rock cools to form new rocks that extend the edge of the plate.



The San Andreas Fault (left) in California, marks the boundary where one plate is sliding past another. This movement causes land tremors and earthquakes in that region.



The ocean floor moves too. In the 1950s a mountain range 3km tall was discovered running down the centre of the Atlantic Ocean. This was formed by volcanoes pushing up new rocks.

Volcanoes are formed when liquid rock is forced to the Earth's surface.

Fault lines occur when one plate is pushed under another plate.

CRASHING CONTINENTS

When two plates crash into each other, the Earth's crust is squeezed and buckled. This often results in a mountain range being formed as the rocks are pushed up between two colliding plates. The Himalayas were formed when India crashed into Asia.

HOT SPOTS

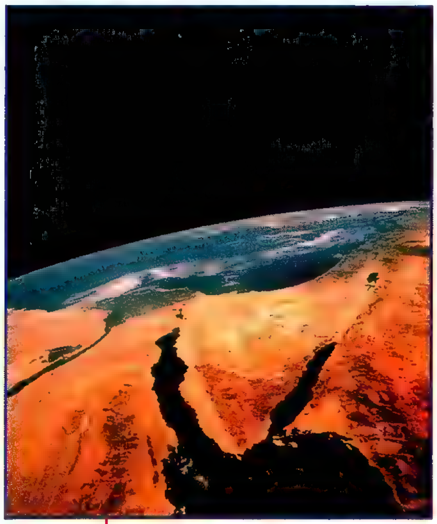
'Hot spots' of activity deep in the mantle also force liquid rock to the surface. This can create new volcanic islands. The Hawaiian islands were formed in this way, when liquid rock hardened on the surface.

RAFTS OF ROCKS

Each continent behaves like a giant raft of rock floating on the liquid mantle of the Earth. As the liquid moves, the continent is pushed around. The African continental raft is moving apart near its eastern edge.

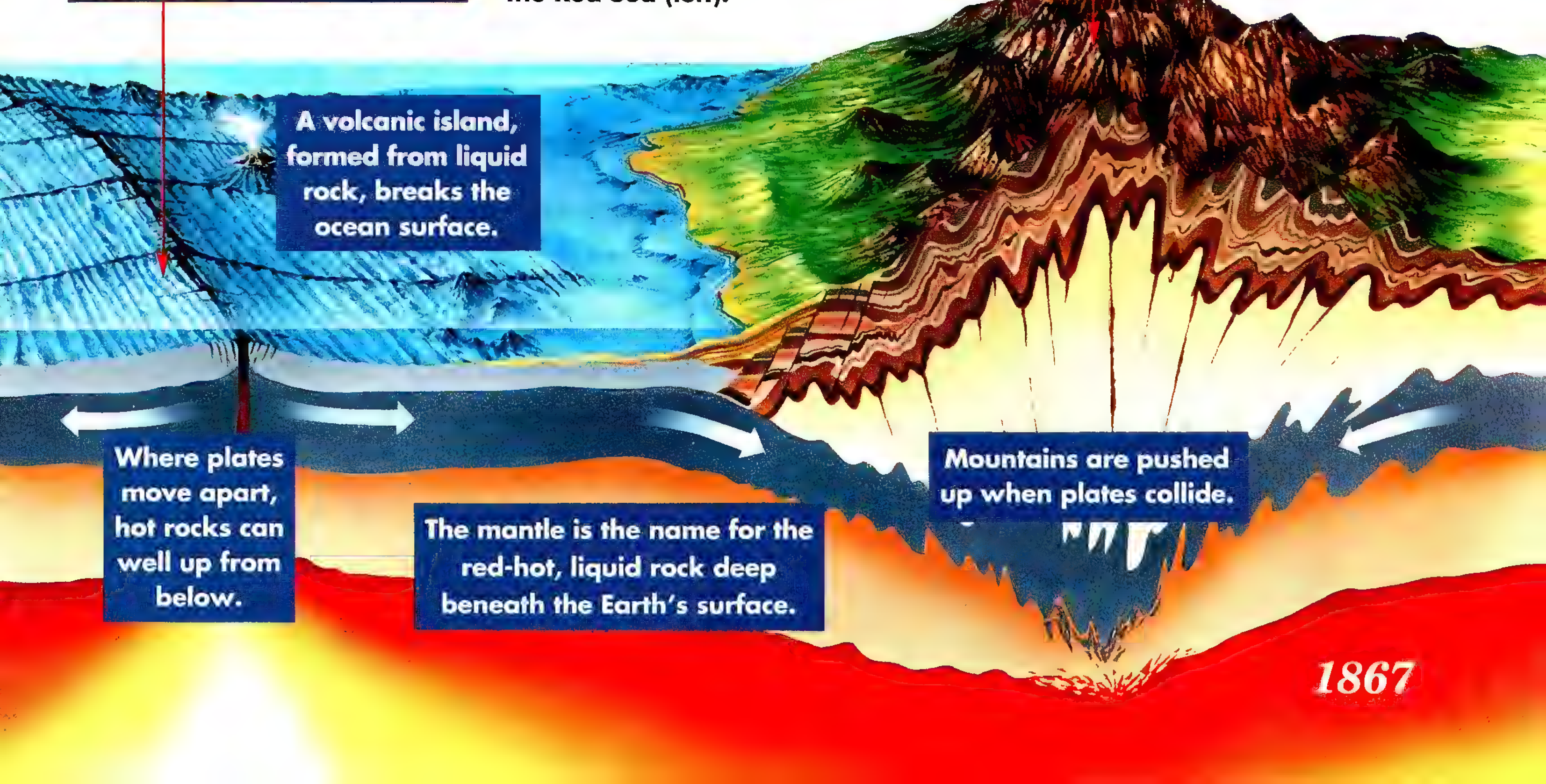
RIFT VALLEY

A giant valley called the Rift Valley is forming as the two blocks of rock pull apart. The rift is widening by a few centimetres a year. In 50 million years' time it may have widened so much that East Africa will split away to form an island. Continental drift is still at work!



The plates that make up the Earth's crust also move apart and form valleys, such as the Great Rift Valley in Africa. The northern part of this valley has flooded to form the Red Sea (left).

The high Himalayan Mountains in Nepal (right) were formed when India crashed into Asia, pushing up the land. This took place over millions of years.



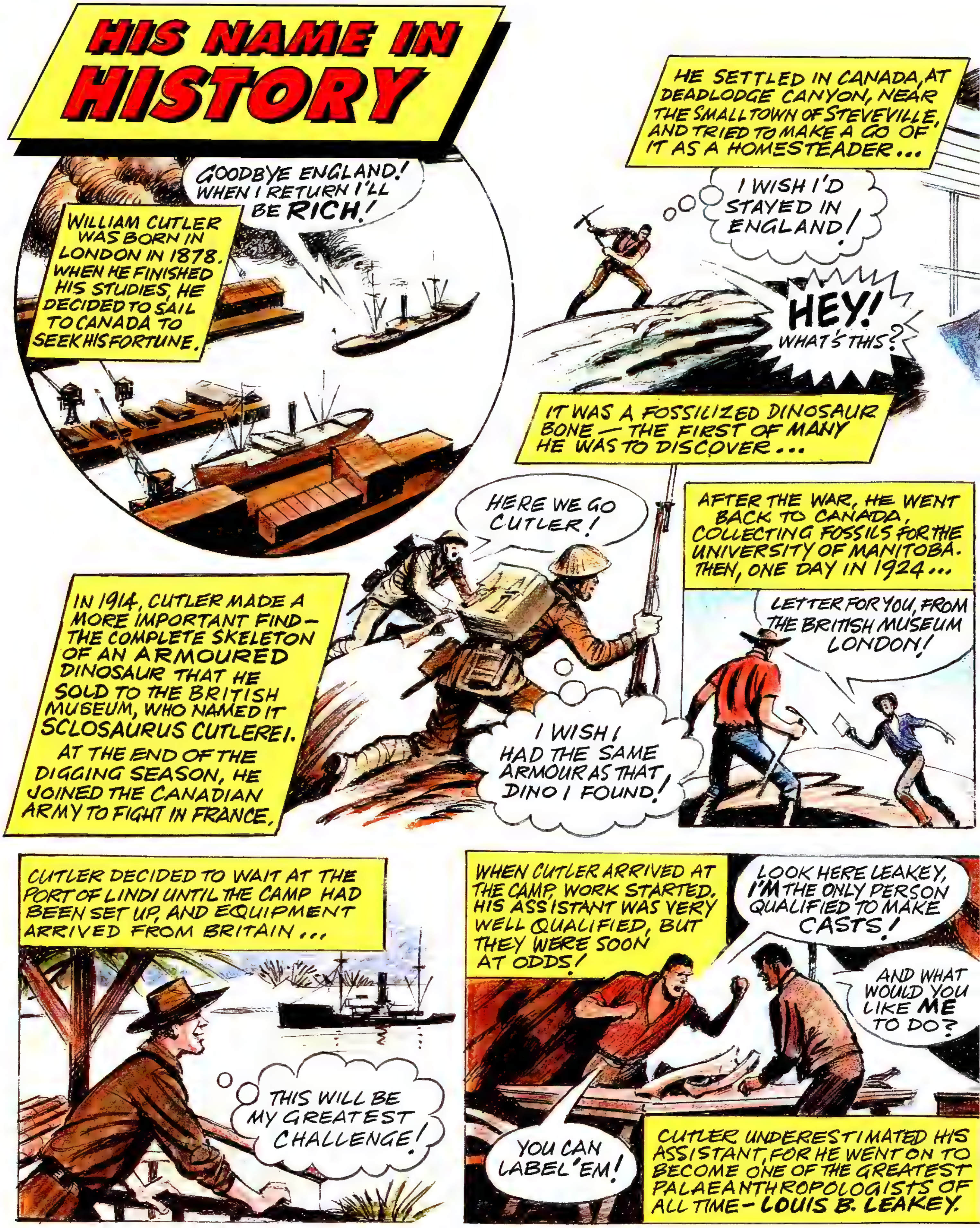
A volcanic island, formed from liquid rock, breaks the ocean surface.

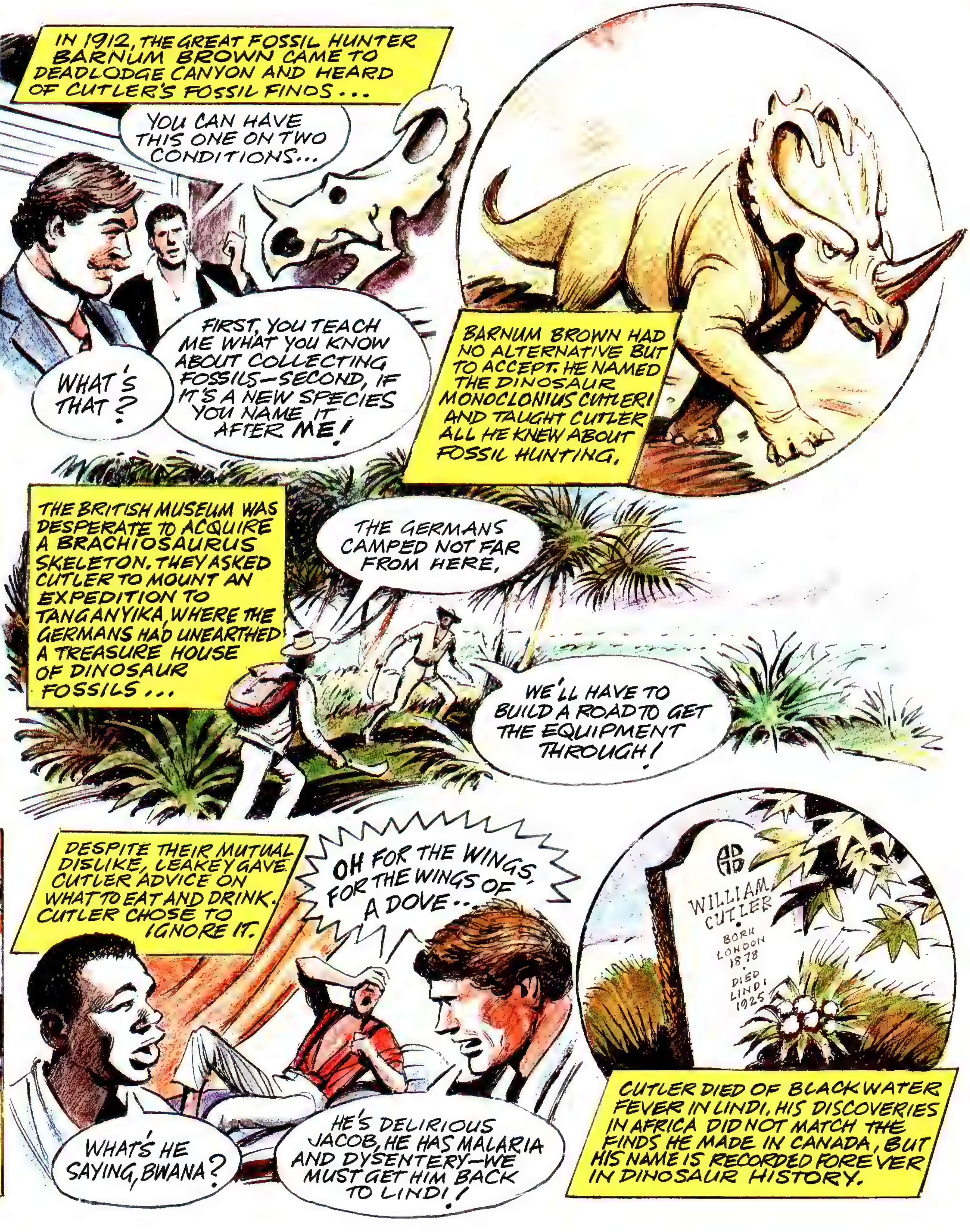
Where plates move apart, hot rocks can well up from below.

The mantle is the name for the red-hot, liquid rock deep beneath the Earth's surface.

Mountains are pushed up when plates collide.

HIS NAME IN HISTORY

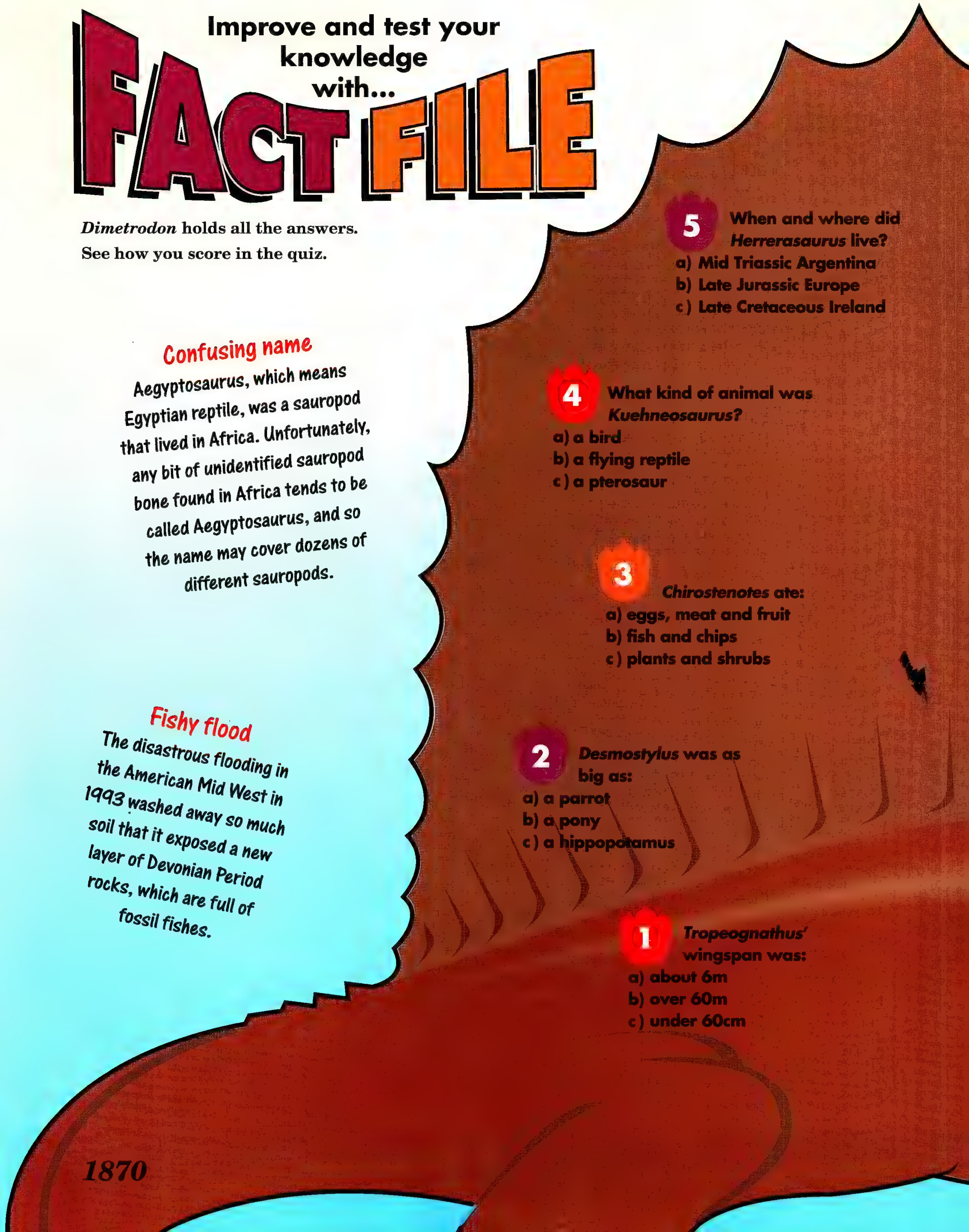

WILLIAM CUTLER WAS BORN IN LONDON IN 1878. WHEN HE FINISHED HIS STUDIES, HE DECIDED TO SAIL TO CANADA TO SEEK HIS FORTUNE.
GOODBYE ENGLAND! WHEN I RETURN I'LL BE RICH!
HE SETTLED IN CANADA, AT DEADLODGE CANYON, NEAR THE SMALL TOWN OF STEVEVILLE, AND TRIED TO MAKE A GO OF IT AS A HOMESTEADER...
I WISH I'D STAYED IN ENGLAND!
HEY! WHAT'S THIS?
IT WAS A FOSSILIZED DINOSAUR BONE — THE FIRST OF MANY HE WAS TO DISCOVER...
IN 1914, CUTLER MADE A MORE IMPORTANT FIND – THE COMPLETE SKELETON OF AN ARMOURED DINOSAUR THAT HE SOLD TO THE BRITISH MUSEUM, WHO NAMED IT SCLOSAURUS CUTLEREI.
AT THE END OF THE DIGGING SEASON, HE JOINED THE CANADIAN ARMY TO FIGHT IN FRANCE.
HERE WE GO CUTLER!
I WISH I HAD THE SAME ARMOUR AS THAT DINO I FOUND!
AFTER THE WAR, HE WENT BACK TO CANADA, COLLECTING FOSSILS FOR THE UNIVERSITY OF MANITOBA. THEN, ONE DAY IN 1924...
LETTER FOR YOU, FROM THE BRITISH MUSEUM LONDON!
CUTLER DECIDED TO WAIT AT THE PORT OF LINDI UNTIL THE CAMP HAD BEEN SET UP, AND EQUIPMENT ARRIVED FROM BRITAIN...
THIS WILL BE MY GREATEST CHALLENGE!
WHEN CUTLER ARRIVED AT THE CAMP, WORK STARTED. HIS ASSISTANT WAS VERY WELL QUALIFIED, BUT THEY WERE SOON AT ODDS!
LOOK HERE LEAKEY, I'M THE ONLY PERSON QUALIFIED TO MAKE CASTS!
AND WHAT WOULD YOU LIKE ME TO DO?
YOU CAN LABEL 'EM!
CUTLER UNDERESTIMATED HIS ASSISTANT, FOR HE WENT ON TO BECOME ONE OF THE GREATEST PALAEANTHROPOLOGISTS OF ALL TIME – LOUIS B. LEAKEY.


IN 1912, THE GREAT FOSSIL HUNTER BARNUM BROWN CAME TO DEADLODGE CANYON AND HEARD OF CUTLER'S FOSSIL FINDS...
YOU CAN HAVE THIS ONE ON TWO CONDITIONS...
WHAT'S THAT?
FIRST, YOU TEACH ME WHAT YOU KNOW ABOUT COLLECTING FOSSILS—SECOND, IF IT'S A NEW SPECIES YOU NAME IT AFTER ME!
BARNUM BROWN HAD NO ALTERNATIVE BUT TO ACCEPT. HE NAMED THE DINOSAUR MONOCLONIUS CUTLERI AND TAUGHT CUTLER ALL HE KNEW ABOUT FOSSIL HUNTING.
THE BRITISH MUSEUM WAS DESPERATE TO ACQUIRE A BRACHIOSAURUS SKELETON. THEY ASKED CUTLER TO MOUNT AN EXPEDITION TO TANGANYIKA, WHERE THE GERMANS HAD UNEARTHED A TREASURE HOUSE OF DINOSAUR FOSSILS...
THE GERMANS CAMPED NOT FAR FROM HERE.
WE'LL HAVE TO BUILD A ROAD TO GET THE EQUIPMENT THROUGH!
DESPITE THEIR MUTUAL DISLIKE, LEAKEY GAVE CUTLER ADVICE ON WHAT TO EAT AND DRINK. CUTLER CHOSE TO IGNORE IT.
OH FOR THE WINGS, FOR THE WINGS OF A DOVE...
WHAT'S HE SAYING, BWANA?
HE'S DELIRIOUS JACOB, HE HAS MALARIA AND DYSENTERY—WE MUST GET HIM BACK TO LINDI!
AB
WILLIAM CUTLER
BORN LONDON 1878
DIED LINDI 1925
CUTLER DIED OF BLACKWATER FEVER IN LINDI. HIS DISCOVERIES IN AFRICA DID NOT MATCH THE FINDS HE MADE IN CANADA, BUT HIS NAME IS RECORDED FOREVER IN DINOSAUR HISTORY.

Improve and test your knowledge with...

FACT FILE

Dimetrodon holds all the answers. See how you score in the quiz.



Confusing name

Aegyptosaurus, which means Egyptian reptile, was a sauropod that lived in Africa. Unfortunately, any bit of unidentified sauropod bone found in Africa tends to be called Aegyptosaurus, and so the name may cover dozens of different sauropods.

Fishy flood

The disastrous flooding in the American Mid West in 1993 washed away so much soil that it exposed a new layer of Devonian Period rocks, which are full of fossil fishes.

1 ***Tropeognathus'* wingspan was:**

- **a) about 6m**
- **b) over 60m**
- **c) under 60cm**

2 ***Desmostylus* was as big as:**

- **a) a parrot**
- **b) a pony**
- **c) a hippopotamus**

3 ***Chirostenotes* ate:**

- **a) eggs, meat and fruit**
- **b) fish and chips**
- **c) plants and shrubs**

4 **What kind of animal was *Kuehneosaurus?***

- **a) a bird**
- **b) a flying reptile**
- **c) a pterosaur**

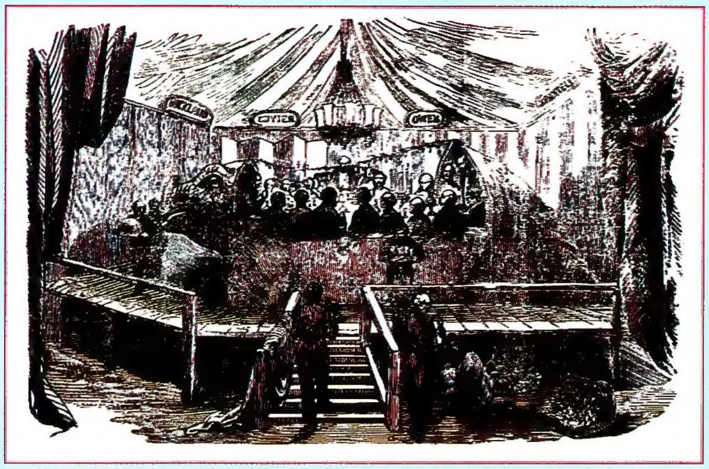
5 **When and where did *Herrerasaurus* live?**

- **a) Mid Triassic Argentina**
- **b) Late Jurassic Europe**
- **c) Late Cretaceous Ireland**

Too many horns?

Pentaceratops means 'five-horned head'. It did not really have five horns, only three. However, a pair of spikes stuck out from the side of the frill, giving the appearance of extra horns.

Dining in a dinosaur!



Between 1852 and 1854, Richard Owen, a British dinosaur expert, joined forces with a sculptor called Waterhouse Hawkins to create some life-sized models of dinosaurs and prehistoric animals. When they had finished, they decided to celebrate by inviting 20 people to dinner – inside the body of Iguanadon!

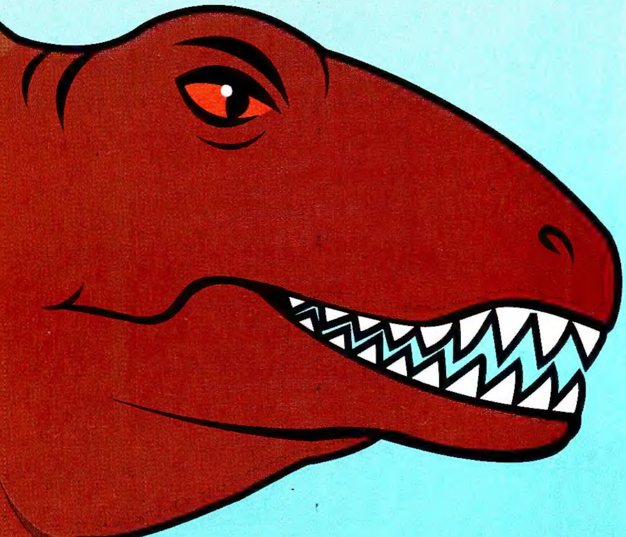
6 What kind of dino laid the giant eggs in China?
a) a tyrannosaur
b) an ankylosaur
c) a pterosaur

7 What is the Earth's mantle?
a) a layer of hot ash
b) a layer of hot rocks
c) the ocean floor

8 Where did William Cutler make his most important finds?
a) Africa
b) South America
c) Canada

9 *Zalambdalestes* had legs like a:
a) miniature kangaroo
b) miniature shrew
c) giant hedgehog

10 *Apatosaurus* means:
a) 'deceit lizard'
b) 'patting lizard'
c) 'truthful lizard'



Answers to the questions on inside back cover

A to Z OF PREHISTORIC ANIMALS YO – ZY

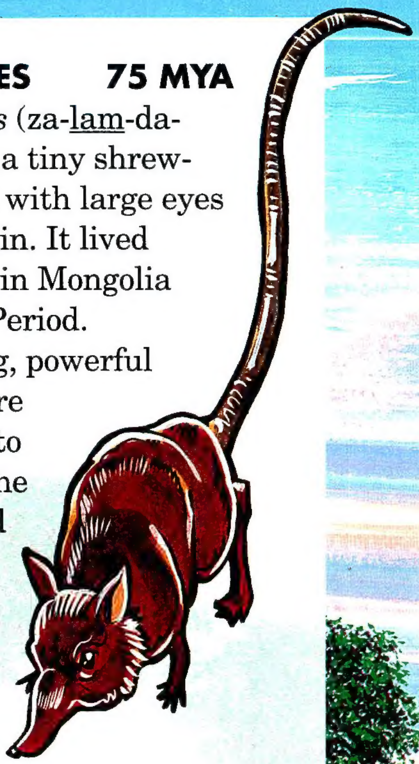
YOUNGINA
260 MYA

Named after a fossil collector called Young, *Youngina* (young-guy-nah) was a small reptile that lived in the Permian Period in the desert-like regions of South Africa. It was about as long as today's rabbit, and probably ate insects and snails, which it crushed with sharp teeth. *Youngina* had long fingers and toes, which helped it to grasp rocks and tree trunks as it moved across the dry, dusty land.

Z

ZAGLOSSUS 2 MYA

Zaglossus (zar-gloss-us) was a giant egg-laying Pleistocene echidna, measuring 65cm in length. Not very different to today's echidnas, it had a spiny body, long snout and a long, sticky tongue. *Zaglossus* could quickly flick out its tongue to capture ants.



ZALAMBDALESTES 75 MYA

Zalambdalestes (za-lam-da-less-tees) was a tiny shrew-like mammal with large eyes and a small brain. It lived alongside the dinosaurs in Mongolia in the Late Cretaceous Period. *Zalambdalestes* had long, powerful back legs like a miniature kangaroo. It used them to run and jump through the undergrowth. At the end of its long, upturned snout it had sharp teeth for chewing up insects.

ZYGOMATURUS
26 MYA

An early relative of marsupials such as today's kangaroo, *Zygomaturus* (zy-go-ma-tur-us) had small, bony horns sticking out from the top of its nose and head. It roamed around Australia from Late Miocene times almost to the present day. Experts think that this plant-eater probably preferred coastal areas and forest habitats.

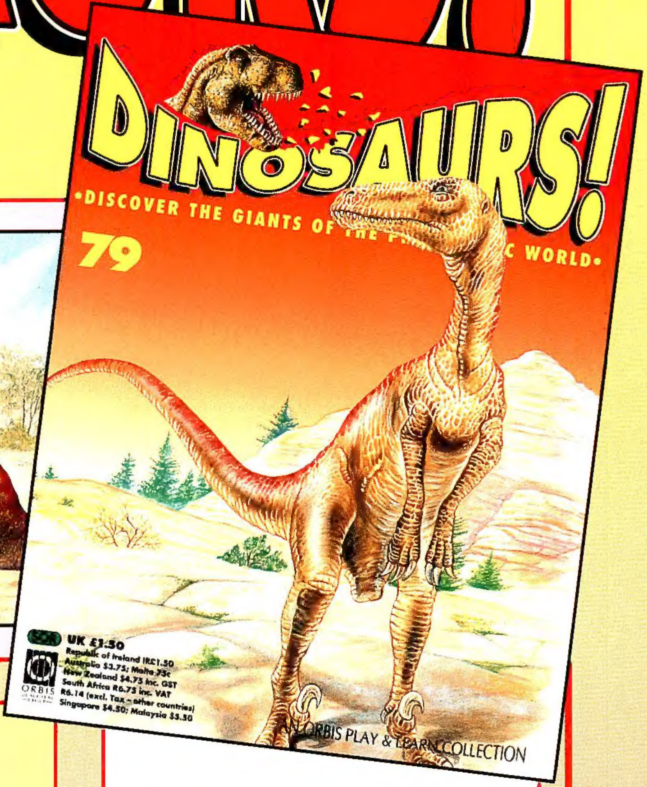
ZYGORHYZA 40 MYA

Swimming in the Late Eocene seas, *Zygorhyza* (zy-go-ri-za) was very similar to today's porpoise. It measured about 7m in length and had an extra-long snout. *Zygorhyza,* which means 'double-rooted teeth', was a powerful swimmer and may have come ashore to mate and to give birth.

MYA = MILLION YEARS AGO

COMING IN PART 79 OF

DINOSAURS!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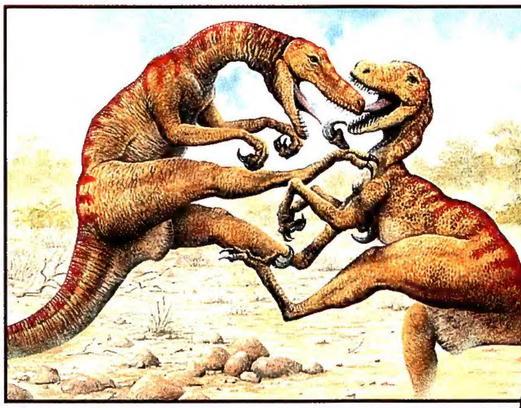
Find out what a mammoth really looked like in TIME DETECTIVE. Relive the Ice Ages in PREHISTORIC WORLD – it will make you shiver!



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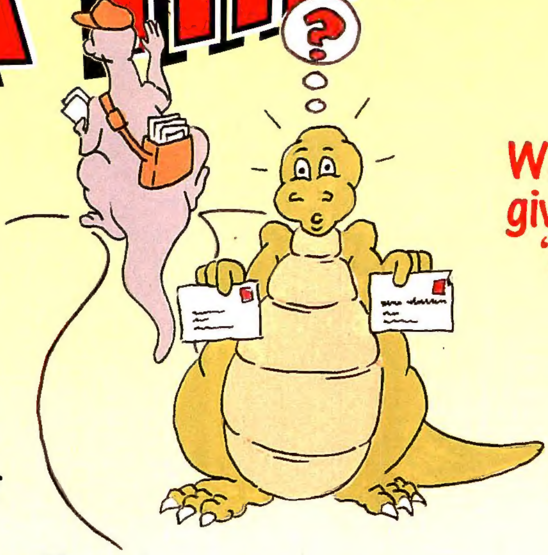
ANSWERS TO FACT FILE QUESTIONS: 1.a 2.b 3.a 4.b 5.a 6.a 7.b 8.c 9.a 10.a

Dr David Norman of Cambridge University answers your dinosaur questions

ASK THE EXPERT

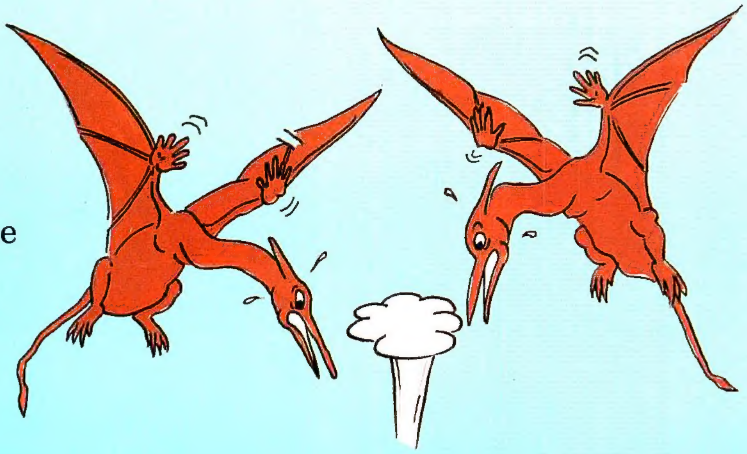


What happens when a dinosaur is given two different names?

If one palaeontologist finds a part of a dinosaur and another finds a different part of it, they may give the dino different names. There is a set of rules, called the International Code of Zoological Nomenclature, used for naming new species. If there is a dispute about which name should be used, a panel of experts makes a decision.

Could small dinosaurs have snatched pterosaurs from the sky?

Small carnivorous dinosaurs were very quick. They had light bodies, big brains and good eyesight. I would imagine that, just as a cat is able to catch a bird, these dinosaurs could catch pterosaurs, particularly when not in flight – on the ground they were clumsy.



Why was Apatosaurus given a name that means 'deceptive reptile'?

I am not entirely sure, so I will have to make an intelligent guess. It may be that the name, which literally means 'deceit lizard', was intended to give the impression that, even though *Apatosaurus* seems to have been a reptile in the strictest anatomical sense, when you consider the size of its bones, there seems to be no way that it could be thought of as like any reptile today. So, giving it a 'saurus' ending to its name, which means 'reptile', actually gives the wrong impression and is deceptive.

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